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EDITORIAL DEPARTMENT NOTE

Standards are the basis for cost control. Growing recognition of the importance of cost control during the war period and the importance of having cost control methods well developed for the post-war period has resulted in a revival of interest in standard cost accounting. However, some companies have hesitated to adopt standard cost methods because of the feeling that they were not appropriate to war contract costing, that they did not apply to the job-order type of production, or for other reasons. In his article in this issue of the *Bulletin* Mr. Myers effectively disposes of these mistaken impressions and at the same time provides an illuminating review of the fundamentals of standard cost accounting.

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Articles published in the *Bulletin* present many different viewpoints. In publishing them the Association is not sponsoring the view expressed, but is endeavoring to provide for its members material which will be helpful and stimulating. Constructive comments are welcomed and will be published in the Forum Section of the *Bulletin*.

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DO STANDARD COSTS AID WAR PRODUCTION?

By Herbert J. Myers, Controller,
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FOR THE past year or more, in personal discussions, I have heard various opinions expressed regarding the acceptability of standard costs by various government agencies. There should be no doubt about this point as the "Green Book" specifically states: "Standard cost accounting systems, that is to say, cost systems making use of standard or normal rates for manufacturing costs as a means of management control are widely in use and are acceptable for cost determination under government contracts, if the variations from actual costs are restored properly so that in the end the costs chargeable to the contract will stand upon the basis of the actual costs."

Apparently, there is some confused thinking on the subject of standard costs for war production. There is also too prevalent the idea that standard costs cannot be used for anything bordering on special-order business and most government business is of this nature.

Use of Standard Cost Accounting Limited

The Research Series No. 1, *N.A.C.A. Bulletin* of April 1, 1943, indicates that only 40 companies out of 143 used the two recognized varieties of standard cost accounting. This study further shows that 123 of the 143 made no change in their method as a result of war production, and of the remaining 20 that changed only one changed completely to standard costs. The other 19 changed from a combination of two or more methods to a new combination of two or more methods which really means very little. This research study shows 56 per cent of the total using some form of so-called actual costs, with job costs strongly predominating.

The limited use of standard costs, and the shying away from them by others all indicates a misunderstanding of their proper use. The first and most compelling use should be for managerial control of operating costs. No other method exists today that will accomplish this. Determination of product costs and/or selling prices should be only an incidental by-product.

Renegotiation Requires No One Method of Cost Accounting

Over-all renegotiation should dispel any fears that actual costs of each contract will be required by the Government. Total company profit is all that is needed with sufficient breakdown in accounts to permit scrutiny of charges for possible disallowed items. Under these circumstances standard costs can readily be used.

Termination of Contracts

Termination of contracts will bring with it the requirements of a claim by individual contracts but here again standard costs will be no handicap. In fact, they will probably be more beneficial than job costs.

At a meeting last May in Cleveland, Colonel McEachren of the War Department stated that there is no objection to the use of standard costs so long as it can be shown they did not exceed actual cost or that they can be adjusted to approximately actual cost.

Claims after contract termination require a complete detailed inventory of all items in your plant and/or at sub-contractor's or vendor's plants. The inventory must be priced in detail and this will be difficult with most job-cost systems whereas it presents no problem for standard costs. Furthermore, with the usual job-cost system, when items physically inventoried are priced and totaled in detail, the amount usually does not equal the total in the job-cost record due to many charges of an intangible and general character which have found their way into the record. Many of these charges are proper but are difficult to associate directly with thousands of individual piece parts in the physical inventory.

Trial and Error Tests

Before conversion to complete war production, government business was a very small percentage of our total business. When we got our first government contract, we felt that to protect ourselves we should set up regular job-costs for the government contracts only. Because this happened to be a small percentage of the total business, we felt that lack of cost control would not be serious even if we missed our quotation costs.

Realizing that some sort of check on costs should be made, a daily report on the labor hours was set up which compared the

cumulative hours by major operations with the total hours used as a basis of the quotation. Everything went along fine until the actual hours equalled those used as the basis for quotation and the job was far from completion. Such experiences on all the first jobs convinced us that only standards could give any control. A change back to standards was made because of a very disappointing experience with job costs.

The question may be asked: "Why weren't the costs analyzed?" They were, and our findings were about the same as those of anybody who has ever tried such a job; practically worthless. They were worthless, regardless of what the facts showed, because it was too late to exercise any control after the facts became available.

Standard Costs Ofttimes in Name Only

Calling a plan standard costs does not mean that a company has standard cost accounting. Standard costs improperly used will not give cost control any more than will job costs. Regardless of whether the method is based on current standards or on basic standards, the same misapplication can occur. Some standard cost installations are merely standards superimposed on job costs. Such an application is useless and in addition a very costly appendage.

There are different ways of superimposing standard costs. The most worthless method is that which charges all costs to a job until the standard or cost estimate has been equalled and then charges all costs exceeding the estimates to variance accounts. Such a method, on the surface, has all the earmarks of standard cost accounting. It gives the standard cost of the job and the inventory is charged at standard. It also provides cost variance accounts which have been referred to as "the only major accounting contribution to management in the past generation."

Cost variance accounts are said to be a management tool for controlling costs. However, if the variance account is not charged until actual costs exceed the standard they are misleading and worthless. Anyone knows that control requires prompt knowledge of excessive costs. Operating the system as just described means that knowledge of any excess is not reflected until the total standard cost for the entire job has been exceeded. Then it is too late even though the variance accounts show high spoilage, labor ineffi-

ciency, etc. In most cases the very costs which were excessive were incurred in the very beginning of the job and were not revealed until the job was nearly complete, which may be months or even a year or more after their occurrance.

Standard cost accounting can only be helpful if the method in actual application segregates and reports the exceptions, or excess costs, as variances, when they occur. This means reporting them immediately. If it takes twice as long as standard time to perform the initial operation on the first piece of a complicated large equipment, the excess should be separated and reported at that time so that something can be done before it is too late. This principle can and should be followed if control is to be realized, regardless of government orders, special orders, or standard repetitive products.

Since one of the main reasons for few applications to government business seems to be the similarity of government business to special-order business a few simple explanations and illustrations of an application to special orders may be helpful.

Brief Review of Principles

Standard cost accounting is the principle of accounting for exceptions, that is, recording and setting out in relief only the variations from the standard itself. The theory is that the standard quantity (material, labor, or burden) which is according to specifications has been figured once in the standard cost records, therefore the only cost to account for, as manufacture continues, is that of any waste in the use of material, labor, or burden.

A simple illustration of the foregoing principle would be a box which, according to the standard cost record, required $.60 for material (labor and burden being ignored for purposes of the example). Let us assume that 1,000 of them are to be made. We first must know that each box required ten board feet of pine lumber, 4/4 No. 1 common, at a standard lumber price for this grade of $60 per thousand feet. Then if we buy 10,000 feet of lumber at $62.50 per thousand, there is a price variation of $25 (10,000 x $2.50 per M). If the manufacturing departments do not spoil any pieces, and if they cut the lumber to as good advantage as standards call for, they will get 1,000 boxes, but if they do not, they will have to request more lumber in order to complete the

1,000 boxes. Any additional lumber required to complete the boxes is another exception and must be accounted for.

Assume there was purchased an additional 500 feet of lumber at $62.50 per M feet, then there would be an additional "price variation" of $1.25 (500 x $2.50) and "excess material" of $30 (500 ft. x $60). All that has been recorded for cost during the processing is the exception of $30 excess material variation. The standard cost was recorded in total for each lot of material when it was received, as well as the price variation. The only records necessary to handle the material accounting that must originate in the shop are—

1. Receiving record.
2. Production record.
3. Record of excess material (or spoiled work).

Another illustration of recording only the exception is as follows:

Assume the purchase of sheet steel blanks to be formed in a press. Each blank will make one of the desired articles. Each blank costs ten cents which we will assume is the standard cost. Here there would be no price variation to record.

When these blanks are processed, if there are no mishaps and the labor operations are paid for on the basis of a 100 per cent wage incentive, there would be no variation at all. In such a case, it would not be necessary to have any records in the plant to report any information for cost accounting because there would not be any material spoilage or any labor variations to report. The costs would be known in advance and there would be no cost accounting needed. However, if any of the blanks were damaged in processing and had to be scrapped, which no doubt would happen to a few, then only those spoiled would have to be reported for accounting purposes.

If the foregoing principles of setting standards and recording exceptions are applied to all the functions and activities of a business the result would be budgetary control.

Budgets Are Based on Standards

Budgets are based on standards. The standards are the details of quantity and price for material, labor, burden, administrative,

and selling expenses as well as a sales price for each article. Budgets are then made up from forecasts which combine all the elements just enumerated.

Budgetary control is the using of all the various standards to hold variable costs of actual operations approximately in line with the forecasted or budgeted results. All variations (gains as well as losses) are recorded separately and classified so that executive action can be taken to bring actual results in line with budgeted results. Revision of the budget during the budget period, which would be bringing the budget in line with actual, is not budgetary control and should not be done except under rare circumstances.

Standards Easily Applied to Standardized Products

It has usually been argued that standard costs fit readily a single product of a limited number of styles. This reasoning seems to be based on an association of the word "standard" with a standard product, hence, "standard costs" and "standard product." It has been claimed that standard costs can only work successfully in a business where the products are very simple and standardized or one of long established methods where changes have been reduced to a minimum. Conversely, it has been claimed that in a business where no two orders are alike, where everything is made to order, nothing but a job-order cost system may be used.

It is easy to understand why the belief persists that standard cost accounting is largely limited to a business that has a simple or standardized product. There is no difficulty in applying standard costs to a product where each operation or process is exactly alike on each part. Another reason, no doubt, has been the mistaken idea that actual results must equal budgeted results and that, therefore, a business could be operated on standard costs only if it had been operating a long time on standardized products and operations, and used materials which have changed but slightly in price. This belief has been proven, it is claimed, by the fact that in such businesses there are but minor variations in actual results, whereas in most other types of business actual results usually vary greatly from budgeted results. The fact that actual results vary considerably from those budgeted is no proof that standards and budgets will not work. It does prove, however, that either standards did not exist or were not made use of in the prep-

aration of the budget, or if they were, the management did a poor job of managing.

The business that seems to be the ideal for standard costs really is the kind that could, without serious difficulty, get along without any cost system. The ideal would be a company which made only one standard product, in which case costs could be determined in about two minutes after total expenditures were known by simply dividing total expenditures by the total production.

Job-Order Costs Found Wanting

However, the special-order business, or most other business where, it is claimed, nothing but a job-order cost system can give satisfactory results, is the very kind of business where job-order costs fail. It is claimed that the job-order is needed to determine what each job costs so that when a "similar job" comes in, a proper quotation can be made. But it must be remembered that quotations are seldom made from job-cost records, and probably ought never to be.

It is further argued that any trouble that occurred on an order, which increased the cost, should be known so as to include this cost in the next quotation. Here again the reasoning is erroneous because:

1. No two jobs are exactly alike.
2. The same trouble never occurs in exactly the same way.
3. Last but not least, costs of trouble should not be charged to the customer; they are the manufacturer's risk and not the customer's. If economic law still works, the customer who pays for these risks eventually will go to a competitor who who has reduced his troubles to a minimum and consequently has a lower price. To some extent this also applies to the Government.

Apparently, the only reason for the attitude that standard costs have only a limited application is that some of their most important uses are not understood.

Why Standard Costs Are Needed in a Special-Order Business

Any special-order business is such that practically all new business is booked on a quotation basis. The first question, and a

logical one, that might be asked is: "On what are the quotations based?" Are they based on known standards, intelligently applied to each new order, or are they based on the thirty years' experience of some practical man who intelligently applies his experience, and sometimes hunches, to each job.

The thirty years' experience, when combined with known standards and applied intelligently and scientifically to each new order, can be invaluable, but when nothing but experience is relied on it may be ruinous.

Material Seldom Causes Trouble

Material standards usually do not cause trouble for special-order business. The reason, no doubt, is because material can be seen, counted, weighed, measured, and calculated. Experience has always been the basis for waste allowance for some kinds of material, so that the allowances for waste are added to the quantities which have been determined from analysis of the article in question. There never has been much discussion about inability to acquire standards of quantity for material for any kind of a business or product. There should be little difficulty in applying standards for material to any kind of business, so the more troublesome element will be discussed more in detail.

Labor and Burden Are Troublesome

It seems that labor is the cost element that causes the most trouble in establishing standards. It has been claimed that a labor standard cannot be established for an article which is entirely unlike any other previously made—yet quotations are made to secure most of this kind of business.

In view of the fact that burden is in most cases applied on labor, or some other basis related to labor time or cost, it presents no difficult problem once labor standards are satisfactorily worked out.

The Basis for Labor Standards

The approach to labor standards should be the same for any kind of business. It should be no different in a special-order business, where no two orders are the same, from what it would be for a business making a standard product with few or no variations. Time study should be the basis for labor standards.

The time-study engineers believe standards can be established for a special-order business in the same way as for any other business. Their point of view has been that all business is the same when it comes to labor operations. They view a business entirely in the light of machines, processes, and operations—and not by the kinds of product that are run through them.

Time study is the only satisfactory basis for labor standards. (Time study, as used throughout, is intended to include all the best methods in use.) Cost accountants have long accepted engineering specifications as the best standard for material. Why should they not accept, as the best standard for labor, a route sheet issued by the time-study engineer? Is not the status of the time-study engineer, for labor and methods in the factory, the same as that of the designing engineer for material? Then why not get a time-study engineer who knows the proper approach to time study, take his route sheets in terms of standard time, and price each operation in the same way as is now done with the material specifications? Lack of proper understanding and cooperation between the time-study engineer and the cost accountant is no doubt responsible for the slow progress made in some of the special-order businesses. The cost accountant must know what is behind correct time studies and the time-study engineer should also know how to convert his efficiencies into labor variations which are expressed in value. The cost accountant and the time-study engineer must cooperate to see that the proper information is obtained for the accounting records.

How Standards Work

The following examples will help to illustrate the application of standard labor costs to a special-order business. As has been previously pointed out, any manufacturing business, whether it makes a single article in large quantities unchanged for a long time, or makes no two articles which are alike, has the same problem when properly analyzed. Every article made has to go through the same machines, the same processes and the same operations as every other article. Therefore, why try to establish a standard for the product? Would it not be better to single out the machines, processes, operations, etc., which remain the same regardless of the article that is processed, and establish standards for them?

A very simple illustration would be a small factory with only one punch press. We will not care what shape article our customers order. Starting with the press, we will time study it and learn that it takes two hours to change a die. Some dies may take longer to change, but they can be classified according to weight or kind of die. However, let us assume our dies are all the same weight and class and we have only one press. Next we must know how long it takes to perform the other operations on the press.

We will probably learn that the simplest operations on the press consist of the following:

1. Pick up blank, place on die and trip press.. .0014 hours
2. Remove part from die and place on truck.. .0010 hours

Now if we know the foregoing we will be able to construct total product standards for parts of any shape or quantity that our customers may order from us.

Let us assume our first customer, "A", orders a part to be stamped out in the shape of a diamond and he wants 10,000 pieces. To make up a quotation we will proceed somewhat as follows: We will measure the smallest blank from which we can punch the diamond of the size he wants and find that it weighs one pound each including the waste. We determined this by referring to any standard chart of weights for each gauge of steel either in a handbook (Mechanical Engineer's Handbook) (Management's Handbook) or any of the books and price lists published by the various steel companies. Then our quotation would be made up somewhat as follows:

Material 10,000 lbs. at $4.80 cwt.		$480.00
Labor—		
Change die	2.0 hours	
Stamp 10,000 pcs. x .0024	24.0 hours	
	26.0 hours	
Labor rate per hour x	.60	
Total labor cost		15.60
Burden at 200% of labor		31.20
Total factory cost		$526.80
Administration and selling expense		131.70
		$658.50
Profit		41.50
Quoted Price		$700.00

Now let us assume that another customer, "B", orders 2,000 blanks punched out like a star from different steel. We will quote him as follows:

Material for 2,000 pcs. required 2,500 lbs. at $4.50 cwt.....		$112.50
Labor—		
Change die	2.0 hours	
Stamp 2,000 pcs. x .0024.....	4.8 hours	
	6.8 hours	
Labor rate per hour x	.60	
Total labor cost		4.08
Burden at 200% of labor.....		8.16
Total factory cost		$124.74
Administrative and selling		31.19
		$155.93
Profit		19.07
Quoted price		$175.00

These quotations are total product standard costs for the orders and no further cost computation needs to be made. The labor standards are the rates we will pay the operator, not per order, but per operation on the press.

Equipment Does Not Change With Different Orders

We can take an order for any shape that can go through this press, and no two may be alike, but our press does not change nor does the time of changing the die or handling the material or running the press. We may get one big order from the Government which will keep the press going continuously, or we may get orders of various shapes and quantities from hundreds of different customers or various government departments. We may make a die that would form a saucer from stainless steel and market it as our own product, which would be a standard product, and still it would make absolutely no difference as far as our standard costs are concerned. The only reports we would need from the shop for cost purposes would be reports of (1) scrap, and (2) production, which tell how efficient the operator was. The only element of cost that needs to be measured to determine how close our standards are met is the labor element. (There are also ways of measuring efficiency in the use of material and the utilization of variable expense.) Labor efficiency can be

measured by machine, process, or operation and it is not necessary or desirable to measure it according to order, part, or product.

On the two orders just illustrated, the standards provide for a total of 28.8 standard hours on the two orders. It is only necessary to know that an operator spent 30 hours to know that there was an excess cost of 1.2 hours on the punch press. It makes no difference on what order the loss occurred. It was the press that caused the trouble, or the operator, or poor material, and not one or the other of the orders.

The examples just given for only one press and two different orders can be expanded to hundreds of different machines, thousands of processes and operations, thousands and thousands of parts, sub-assemblies, and special-orders. The principles will still be the same.

Basic Standards for Machines and Processes

One thing always to remember is that labor is the difficult cost element, and that labor standards should be established first for all the machines, processes, or operations and not by products, parts, sub-assemblies or orders. These basic standards should then be charted in usable form from which a standard cost for each order could be assembled. Then measure the labor efficiency by machines and processes, by operators or groups of operators or by departments—rather than by products, orders or parts. (See *Time* and *Motion Study* by Lowry, Maynard and Stegemerten for details on how to construct synthetic standards.)

Occasionally in actual practice an order for some article will come along which will require an entirely new process or operation. However, at least 90 per cent of the labor operations are already in existence and a time-study engineer can estimate quite closely the time required to perform the new operation. He will, of course, check the operation as soon as it is performed so that he will not have to estimate it the next time. It is well to point out the small effect on the total of any error made in the small amount that has to be estimated. Usually the new processes will be even less than 10 per cent of the total. But in most businesses the material cost is nearly half the manufacturing cost; therefore the labor cost must be considerably less. Percentages based on

figures reported for all industries by the 1931 census of manufacturers are as follows:

Material	51.7%
Labor	17.5

From the above it can readily be seen that an error even as great as 50 per cent of the 10 per cent of the labor which had to be estimated would only throw the labor cost off by 875/1000 of one per cent (.175 x .10 x .50).

Any time-study engineer who has carefully collected, classified, and tabulated his basic standards, and is capable of doing a good job of it, can estimate a time standard for a new process that will be in error considerably less than 50 per cent.

The reason time study is emphasized is because it is believed that not enough attention has been given time study as a basis for scientifically establishing labor standards. There has not been enough cooperation between, or understanding of, the mutual problems of the cost accountant and the time-study engineer. If material standards are based on engineering specifications, why should not labor standards also be based on engineering specifications? The specifications for labor should be labor route sheets showing the operations to be performed and the standard task time for each. These route sheets should be issued by the time-study engineer.

Bringing all the costs together, summarizing them, keeping the necessary files up-to-date, and accumulating the cost variances are all the cost accountant's job. It is essential that the cost accountant—also the general accountant—understand more fully how standards are established and where they can and should be used.

War Production Needs Cost Control

It is just as essential to control the costs of war production as it is under normal highly competitive conditions. Some day we will be back in commercial activities again and in a market that will be no less competitive than it was before. If for no other reason, it is a good thing to get in practice and keep in practice. It is also everyone's patriotic duty to help keep the cost of the war as low as possible.

War production, or government work, is to a large extent on special order. However, the thing to keep in mind is that you are selling plant capacity and not a product. As previously stated, equipment does not change with different orders; different kinds of products or contracts all have to flow through the equipment, machines, processes, and/or operations which are already in your plant. If new and different equipment is required it still doesn't change the principles outlined herein.

New equipment or machines always have known capacities which has been determined by their makers. New processes developed in your own plant may have to be guessed at the first time, but again the error compared to the total is likely to be so small as not to be critical. Furthermore, regardless of the error, if actual performance is compared with the estimate, cost control is obtained no matter how far off the estimate may be. Also, from an accounting standpoint, if cost of production is always credited with the amount for which it was charged, the cost of inventory will always be correct, or in shop talk "if you take it out on the same basis as you put it in, the inventory will be right."

Cost Control Technique

It is only good business to learn to extend cost control and/or simplify its mechanics. Control is out of the question without standards. Standards can and should be established for the machines and processes in the plant regardless of what kind of a product may now be run through them. Reports should be developed that will separate any excess costs immediately at the time it happens. The report should show where it occurred, and the machine, process, operation, department, group, or man responsible. The detail needed will depend on the peculiarities and needs of each management being served.

One thing is certain: control of costs is more essential for special-order business in commercial competition than in a standardized business. It should be practiced on war production to keep down the cost of war, as well as to keep in practice for the commercial competition to come.